

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

a multilayer stack, comprising a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and

2. A phase modulator according to claim 1 wherein said multilayer stack uses a bandpass multilayer stack.

3. A phase modulator according to claim 1 wherein said at least optical property is refractive index, said dielectric layers each have a refractive index value, and said phase modulator means causes a variation in the refractive index of said dielectric layers such as to produce the shift in the transmission function.

4. A phase modulator according to claim 3 wherein said modulator means decreases the refractive index of said dielectric layers so as to shift the transmission function to shorter wavelengths.

5. A phase modulator according to claim 4 wherein said dielectric layers comprise GaAs and AlAs layers and said decrease is between 0% and 2.0%.

6. A phase modulator according to claim 5 wherein said decrease is about 1.3%.

7. A phase modulator according to claim 1 wherein said dielectric layers comprise both layers having a high index of refraction and layers having a low index of refraction.

8. A phase modulator according to claim 1 wherein said dielectric layers include alternating GaAs and AlAs layers.

9. A phase modulator according to claim 8 wherein layers of relatively thin layers of AlAs are inserted within selected layers of GaAs to smooth the transmission function of the stack.

10. A phase modulator according to claim 8 wherein said layers include a plurality of relatively thick layers of GaAs are interspersed at regular intervals within the stack.

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11. A phase modulator according to claim 1 wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal.

12. A phase modulator according to claim 3 wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal.

13. A phase modulator according to claim 1 wherein said modulation means comprises means for externally injecting free carriers to provide phase modulation of the optical input signal.

14. A phase modulator according to claim 3 wherein said modulation means comprises free carrier injection means for adjusting free carrier flow through the stack so as to vary the refractive index of the layers.

15. A phase modulator according to claim 3 wherein the layers are doped with a medium exhibiting of a refractive index which varies in a nonlinear manner with optical intensity and said modulator means comprises an optical pump for generating an optical beam which, in combination with the propagating optical input signal, modulates the refractive index of the layers.

16. A phase modulator according to claim 1 wherein said dielectric layers include GaAs layers, wherein at least one quantum well is created within each GaAs layer and said modulation means comprises means for applying an electric field to the layers of said stack.

17. An optical switch comprising:
a multilayer stack, comprising a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and
optical switching means for producing a nonmechanical change in at least one optical property of the stack to provide shifting of the transmission function to a region of high reflectivity.

18. An optical switch according to claim 1 wherein said at least optical property is refractive index, said dielectric layers each have a refractive index value, and said optical switching means causes an increase in the refractive index of said dielectric layers so as to shift in the transmission function to longer wavelengths.

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